

Windows 2000 Update: Terminal Services Comes of Age

By Dana Lloyd

Now an integral part of the Windows 2000 Server operating system, Terminal Services offers clients access to Windows applications—while the applications run entirely on the server. This article outlines the features of Terminal Services, a cost-effective and highly manageable solution, and explains how to decide between its two modes of operation: Application Server and Remote Administration.

For most companies, the “one size fits all” computing model does not always make for good business sense. Using the Microsoft Windows 2000 operating system platform, customers can now choose the computing model that best suits their needs, whether it is a widely distributed client/server model, a centralized computing model, or a combination of the two—or even computing across the Internet.

With the integration of Windows 2000 Terminal Services into the core server operating system, customers can now choose to deploy the latest Windows-based applications in a fully server-centric mode, where applications run entirely on the server. Microsoft has fully integrated this technology into the Windows 2000 Server operating system family to meet a broad range of corporate customer needs.

Terminal Services is now an *integral* part of Windows 2000 server technology, which delivers the Windows graphical user interface (GUI) through a server-based computing model. In the past, this functionality was provided in a specialized version of Windows NT Server 4.0 known as Microsoft Windows Terminal Server Edition (WTSE). Prior to WTSE, concurrent multi-user

capability was only available from a third-party provider, Citrix[®], as a modification to a Windows NT 3.51-based kernel known as WinFrame[®]. However, in the Microsoft Windows 2000 Server family of products, there have been many new additions to the core services that greatly extend the base functionality and enhance the value of Terminal Services for an enterprise of any size.

Terminal Services is actually an optional service, which can be enabled on any Windows 2000 server, whether it is the standard Windows 2000 Server version, Windows 2000 Advanced Server, or Windows 2000 Datacenter Server.

From high-end clustered servers serving thousands of data-entry terminals to a single server with a customized solution meeting the needs of a small business, Terminal Services in Windows 2000 is a cost-effective and highly manageable solution. When Terminal Services is enabled on Windows 2000 Server, administrators do not have to install all Windows-based 32-bit applications on each desktop computer. Instead, the application can be installed once on the server, and clients automatically have access to the new or upgraded software package through terminal emulation.

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Terminal Services—Two Modes of Operation

There are two modes to choose from when enabling Terminal Services. The original mode, named “Application Server,” is similar in usage to Windows NT Server 4.0, Terminal Server Edition. The newer mode is referred to as “Remote Administration” and can be used to remotely log on to and manage a system as if you were sitting directly in front of the actual system console.

Application Server Mode

In Application Server mode, applications can be deployed and managed from a central location, saving administrators initial development and deployment time—as well as the time and effort required for maintenance and upgrades. Once an application is deployed using Terminal Services, many clients can connect to the server—whether through a remote access connection, local area network (LAN), or wide area network (WAN). Clients can be Windows-based, Windows CE-based, or even non-Windows-based.

Licensing is required when deploying a Terminal Services-enabled server as an application server. Each client, regardless of the type of operating system and protocol used to connect to Terminal Services, must have the Terminal Services Client Access License (CAL) as well as a Windows 2000 Server CAL. Each copy of Windows 2000 Professional includes a Terminal Services CAL, but not a Windows 2000 Server CAL. To gain access from earlier versions of Microsoft Windows NT, as well as from other operating systems, clients must purchase a Terminal Services CAL and Windows 2000 Server CAL, or the appropriate upgrade licenses.

Note: One key aspect to remember is that a Windows 2000 Professional client already has a built-in CAL for Terminal Services.

Application Server mode configures Terminal Services in several specific ways, including the following:

- Memory and CPU utilization are geared toward interactive applications.
- Terminal Services is optimized to handle many sessions, which increases the service overhead.
- Terminal Services application compatibility is enhanced to aid applications that are not aware of the Terminal Services environment.
- License allocation is provided for each device that connects to a Terminal Services session.

Although the performance costs of using Application Server mode are reasonable on a server dedicated to application

serving, these costs can be detrimental on a mission-critical BackOffice® family server. Similarly, specialized installation and device licensing are critical to an application server, but they are cumbersome and unnecessary in a focused operations environment. These configurations are not required when using Terminal Services in Remote Administration mode. It is for these reasons that a second Terminal Services mode was added to the Windows 2000 operating system.

Remote Administration

Terminal Services Remote Administration mode allows any server running Windows 2000 Server (for instance, a domain controller, or BackOffice server) to be administrated remotely with full access to all the built-in GUI-based

administrative tools, as if the administrator was sitting right at the server. This ability to administer the server can be made available from any client device, including legacy MS-DOS-based PCs, Windows 95 or Windows 98, Windows NT, or even non-Windows-based clients.

This server-management feature is an invaluable tool for quick and easy administration of large- and small-scale networks. Terminal Services has two built-in per-server connections specifically for remote administration. A Terminal Services CAL is *not* required to connect to Terminal Services in Remote Administration mode. Although the Terminal Services client

software for 16-bit and 32-bit Windows-based computers is included with Windows 2000 Server, non-Windows-based clients require a third-party add-on.

Remote Administration mode addresses these concerns:

- Memory and CPU utilization settings are left unaffected.
- Terminal Services is enabled with minimal impact on the server.
- Terminal Services application compatibility settings are completely disabled.
- Terminal Services licensing requirements are dropped and replaced by two concurrent administrator connections without installing a license on the client.

The Terminal Services component is tightly integrated into the kernel and is available on every Windows 2000 Server installation. Enabling Terminal Services in Remote Administration mode requires no additional disk space and has a minimal performance impact. It requires only about 2 MB of server memory and has a negligible impact on CPU usage. Performance is only affected when a remote session is logged on, similar in cost to the console. The impact is generally minor. Although, if the user is running

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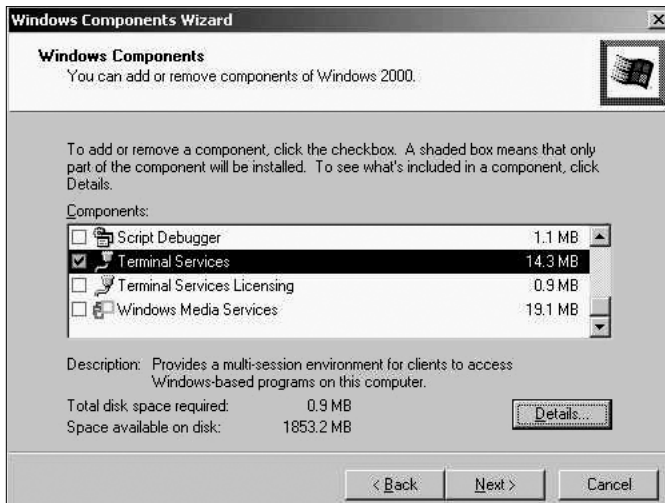


Figure 1. Enabling Terminal Services

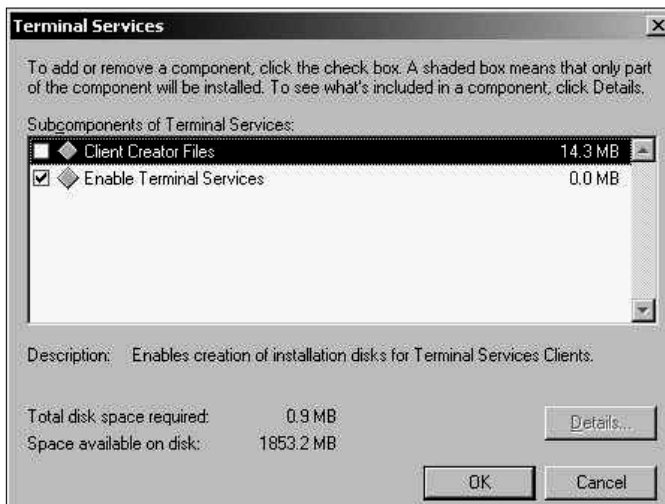


Figure 2. Disable Client Creator

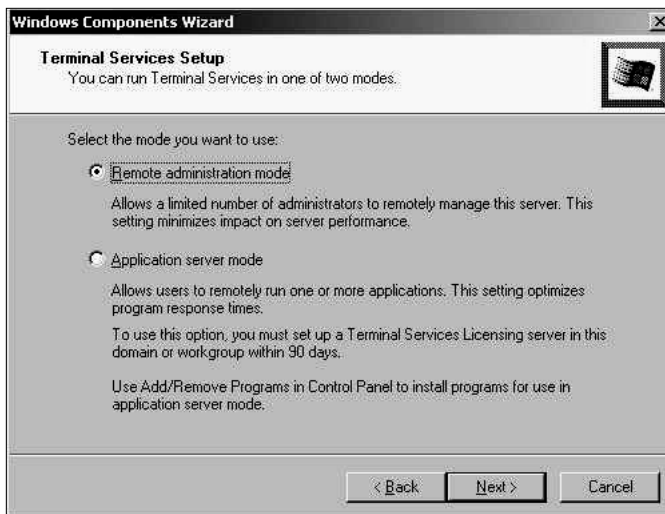


Figure 3. Terminal Services Setup Choices

several applications and performance monitors on the remote system, overall system performance can suffer.

Note: For the above reasons, Microsoft recommends enabling Terminal Services in Remote Administration mode on every Windows 2000 BackOffice server or domain controller.

Enabling Terminal Services for Remote Administration

Deploying Terminal Services for Remote Administration requires that the Terminal Services component is enabled either during installation, or afterward using the Windows Components Wizard found by clicking **Add/Remove Programs** in Control Panel, and then clicking **Add/Remove Windows Components**. Figure 1 shows Terminal Services being enabled.

Note: The Terminal Services Licensing service must be enabled only if there are other Windows 2000 servers running Terminal Services in Application Server mode. It is not required for Remote Administration mode.

By default, the various Terminal Services client software is installed in the %systemroot%\system32\clients\tsc\client directory. In large server farms, you may want to prevent the client software from being installed on every server. To do this, select **Terminal Services**, click **Details**, clear the Client Creator Files check box, and click **OK**. See Figure 2.

Once the **Terminal Services** check box is selected, clicking **Next** gives the administrator the option of specifying in which mode Terminal Services should be enabled. Remote Administration is the default mode, as shown in Figure 3.

Once Terminal Services is enabled, the server must be rebooted. This can either be done immediately or can be scheduled during the next maintenance window. Remote Administration mode cannot be used until this is performed.

The Benefits of Remote Administration

The Remote Administration mode of Terminal Services includes the following features and benefits:

- Graphical administration of Windows 2000 servers from any Terminal Services client; client access is available from computers running Windows for Workgroups, Windows 95, Windows 98, Windows CE 2.11, Windows NT, and Windows 2000
- Remote upgrades, reboots, and promotion and demotion of domain controllers
- Access to servers over low-bandwidth connections with up to 128-bit encryption (56-bit outside of North America)
- Roaming disconnect support, allowing data-sensitive or time-consuming tasks to be completed successfully if the remote session is disconnected deliberately or due to network problems

- Remote application installation and execution with fast access to local disks and media; for example, when copying large files and performing virus scans
- Console session is left unaffected while remote administration takes place, eliminating eavesdropping
- Negligible performance impact on the server and no impact on application compatibility
- Two remote administrators can share a session for collaboration purposes
- Remote Desktop Protocol (RDP) feature set, including local printing, clipboard mapping (cut, copy, and paste), and support for any RDP virtual channel applications, such as local drive mapping (available in the Windows 2000 Resource Kit)
- No Terminal Services Client Access Licensing requirements

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Application Server mode gives system administrators the ability to centrally deploy applications to a wide variety of desktops, saving time and effort developing, supporting, and maintaining the application on each device and platform. Remote Administration mode gives administrators the ability to fully manage computers running Windows 2000 Server from anywhere—inside the computer room or halfway around the world. Both modes allow applications to perform efficiently over low-bandwidth connections, as only the application display and user input are transmitted between the server and the client.

For the latest information on the Microsoft Windows 2000 Server family and Terminal Services, visit the Microsoft Windows Web site at www.microsoft.com/windows2000/guide/server/overview/default.asp ◆

Terminal Services is a Strategic Technology

Microsoft Windows 2000 Terminal Services is a strategic technology that can lower total cost of ownership. In addition, it can provide desktops that cannot run the Windows 2000 operating system with access to Windows-based applications.

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Migrating to Windows 2000

Dell is offering new services as part of its Windows 2000 Premier Migration Program to support customers as they transition to the Microsoft Windows 2000 platform.

Dell first introduced its Windows 2000 Premier Migration Program in November 1998 to assist customers in their evaluation and transition process to Windows 2000. Current offerings of the program include:

- **Dell Technology Consulting (DTC) Services:** Dell products can be implemented and optimized with an array of services, including migration consulting, planning, training, implementation, and system management for Windows 2000.
- **Windows 2000-based Information and Training Resources:** As a Windows 2000 development associate with Microsoft Corporation, Dell has vast expertise in optimizing the Windows 2000 platform for any customer environment. Customers can use Dell's Web-based FAQs, the Dell Talk™ forum, and online interactive training from EducateU (www.support.dell.com).
- **Windows 2000-based Readiness Advisor:** Any Dell customer can use the Web-based Readiness Advisor, which uses their Dell system's service tag number, to provide upgrade advice for their specific PC or server to Windows 2000.
- **Custom Factory Integration:** Windows 2000-based software images can be loaded directly onto Dell PCs and servers before they leave the factory.
- **Installation:** Qualified technicians are available to install Dell Windows 2000-based systems at the customer location.
- **Technical Support for Windows 2000:** Dell's 24x7 toll-free telephone technical support representatives are fully trained on Windows 2000 and available to help customers with start-up and support issues.

To learn more about this program, visit the Dell Web site at www.dell.com.